## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments filed 8/27/2010 have been fully considered but they are not persuasive.

2. Applicant's arguments with respect to claims 1-3, 5-13, 15-17, 19, 20, 24-32, 35, 36 and 38-56 have been considered but are moot in view of the new ground(s) of rejection.

### *Claim Objections*

1. Claims 5 and 51 are objected to because of the following informalities:

The term "the" (claim 5, line 2) should be removed to correct grammatical error.

Claim 51 is a duplicate of claim 45 and should be removed.

Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1, 6, 12, 17, 25, and 40 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The term "storage logic" (claim 1, line 3) is not disclosed, described or suggested anywhere in the original specification. The specification only describes a logical decision process for navigating the mobile robot (page 13, line 30).

The term "a navigator" (claim 1, line 4) introduces a new element that is not disclosed, described or suggested anywhere in the original specification.

The term "a differentiator" (claim 6, line 3 and claim 25, line 3) introduces a new element that is not disclosed, described or suggested anywhere in the original specification.

The term "locator" (claim 12, line 9 and line 15 and claim 17, line 10) introduces a new element that is not disclosed, described or suggested anywhere in the original specification.

The term "a set of" (claim 17, line 1) introduces a new characteristic of storage media that is not disclosed, described or suggested anywhere in the original specification.

The terms "a first part of the path" and "a second part of the path" (claims 40, lines 4-7) are not described or suggested anywhere in the original specification. The original specification only describes different parts of the same area (page 6, lines 7-12) and not different parts of the path.

The Applicant is requested to specifically point out where these elements are disclosed, described and/or suggested in the original specification.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1, 24 and 40 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. Claim 1 recites the limitation "the sensor" in line 12. There is insufficient antecedent basis for this limitation in the claim.

7. Claim 24 recites the limitation "the locator" in line 2. There is insufficient antecedent basis for this limitation in the claim.

The terms "a first part of the path" and "a second part of the path" (claim 40, lines 4-6) are ambiguous rendering the claim indefinite because the claim does not have sufficient description of "a first part" and "a second part" of the path. The claim defines "deviating away from the path in response to detecting an obstacle obstructing **a first part of the path**" but the first path of the path is ambiguous as to where does the first path is defined on the path. The claim recites "producing emissions along **a second part** of the path not obstructed by the obstacle" but does not define the second part or the bounds of this second part of the path. Note that these terms are not described or suggested in the original specification as discussed above.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claims 1-3, 5-10, 12, 13, 15-17, 19, 20, 24-29, 34, 35, 38, 39 and 40-48, 50-54are rejected under 35 U.S.C. 103(a) as being unpatentable over Ruffner (US 2002/0156556), Huynh et al. (5,529,432) and Allen et al. (5,995,884).

For claims 1-3, 12, 13, 15, 17, 19, 34, 38 and 40-42, Ruffner discloses a robot system having at least one mobile robot, for treating a surface, which comprises map storage logic to store a map of the surface to be treated and a navigator to navigate the mobile robot to at least one point on a surface; wherein the mobile robot is configured to: identify its position with respect to the surface to be treated (Abstract, paragraph 0078); automatically deviate the mobile robot away from its initial path in the event that an obstacle is detected along its path; store and/or communicate data concerning the surface treatment performed and any obstacles detected by a sensor (Paragraph 0089, 0090, 0094 and 0119); and produce emissions of fertilizing, watering, or applying pesticides (Paragraph 0076).

Although Ruffner does not specifically discloses producing emissions comprising symbols, lines, shapes, or written characters in one or more colours for treating at least one point on a surface, It would have been obvious for one of ordinary skill in the art the

robot system is capable of being programmed to emit symbols, lines, shapes, or written characters with colours on a surface. Huynh discloses a robot system for emitting different symbols, lines, shapes and characters (Fig. 9-13, and 15).

Ruffner discloses dispensing at least ink, paint, glue, liquid, chemical or powder and chemically react with the surface to be treated (Paragraph 0079), but does not disclose dispense a gas, light to mark, etch or decorate. However, it would have been obvious for one of ordinary skill in the art to dispense these known materials as desired or as needed for the task.

Ruffner discloses the robot system comprises an on-board computer including map storage to store and/or communicate data concerning the surface treatment performed and any obstacles detected (Paragraph 0031, 0033, 0090 and 0119).

Ruffner teaches generating path data but does not specifically disclose the path data is inputted in the form of a file such as a file from a CAD-system. It is known in the art to plot and generate path data for the robot using various types of navigation programs including CAD system.

Ruffner does not specifically disclose the mobile robot is configured producing emissions along a second part of the path not obstructed by the obstacle and to return to an area in which an obstacle was detected after a pre-determined time to check whether the obstacle is still present and whether it is therefore still hindered from performing surface treatment in that area. Allen discloses a cleaning mobile robot that Is configured to proceed to perform task on other surface and return to an area in which an obstacle was detected after a pre-determined time to check whether the obstacle is

still present and whether it is therefore still hindered from performing surface treatment in that area (Col. 34, line 46 – col. 35, line 8, col. 36, lines 46-63 and col. 37, lines 3-24). It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the invention of Ruffner to program the robot to return to the area having an obstacle present to check if an obstacle has been removed, taught by Allen to attempt treating the preprogrammed task entirely and not leaving untreated areas.

For claims 5, 24, 43 and 44, Ruffner discloses identify its position via at least one of the following types of sensor; optical, laser, imaging, electromagnetic, sonar, GPS, motion, angle detection, contact or direction sensors (Abstract, paragraph 0132-0134).

Ruffner does not specifically disclose thermal imaging and pressure to locate the robot. However, it would have been obvious for one of ordinary skill in the art to use these known sensors to locate the robot.

For claims 6, 25 and 50, Ruffner discloses differentiate between different objects or different parts of the same object by detecting differences in the reflectivity of the different materials constituting those objects (Paragraph 0089). It is known in the art to use reflectivity of materials to differentiate materials.

For claims 7-10, 26-29, 45-48 and 51-54, Ruffner discloses wired or wireless communication using antenna to communicate with a remote user, control system or computer network or another robot (Fig. 8 and paragraph 0033, 0064-0070); report that an obstacle has been encountered by a mobile robot if the obstacle has not been

removed after a predetermined time (Paragraph 0219); and the mobile robot traverses to surfaces both to be treated and not to be treated. (Paragraph 0253-0255)

Although Ruffner does not specifically disclose report the obstacle encountered if the obstacle has not be removed after a predetermined time, it would have been obvious such predetermined time for confirming the present of an obstacle is common in the art and is almost inherent that obstacle sensing require detection and processing especially with the use of contact type sensors to prevent erroneous detection.

For claims 16 and 35, Ruffner discloses one or more points or parts of a permanent structure having a complex geometry and located in the working area of the mobile robot is marked with reflective material to strengthen the signals reflected from said points or parts to facilitate correspondence between data from the locator and data from the robot system's map (Paragraph 0059, 0064, 0119, lines 22-35, 0121).

For claims 20 and 39, Ruffner discloses the system contains data stored thereon containing a map of a surface and optionally a pre-programmed path to direct the, or each, mobile robot around that path (Fig. 10, paragraph 0158, 0163).

11. Claims 11, 30 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ruffner (US 2002/0156556), Huynh et al. (5,529,432) and Allen et al. (5,995,884) as applied to claims 1 and 10 above, and further in view of Bottomley et al. (6,941,199).

For claims 11, 30 and 49, Ruffner discloses remove emissions produced by the same or another mobile robot in the same or a previous run respectively (Abstract, paragraph 0027). While producing and removing emission depends on the tasks desire,

Ruffner discloses vacuuming, sanding, waxing, polishing, shampooing, or pressure washing. It is obvious after the task of shampooing or sanding is completed, vacuuming, polishing or pressure washing would be desired to remove the previously applied and/or generated material from the surface. Bottomley discloses a cleaning robot applying a second chemical over the first, neutralizing the characteristic properties of the first chemical (Col. 10, lines 25-31)

12. Claims 31 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ruffner (US 2002/0156556), Huynh et al. (5,529,432) and Allen et al. (5,995,884) as applied to claim 1 above, and further in view of McMurtry et al. (US 2005/0055142).

For claims 31 and 55, Ruffner discloses the mobile robot is indicate or mark out any indoor or outdoor surface comprising construction site (Paragraph 0071, 0076, an indoor or outdoor application as in construction site).

Although Ruffner does not specifically disclose marking a physical lay-out of an exhibition or a trade fair, it would have been obvious for one of ordinary skill in the art to perform such task not only in exhibition or a trade fair but on any desirable surfaces and/or location. McMurtry discloses marking a physical lay-out on surfaces (Fig. 30-31, paragraph 0003-0008).

13. Claims 32, 36, 37 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ruffner (US 2002/0156556), Huynh et al. (5,529,432) and Allen et al.

(5,995,884) as applied to claims 1 and 12 above, and further in view of Verbeek (6,039,056).

For claims 32, 36, 37 and 56, Ruffner does not specifically disclose the robot is mark out a physical lay-out at a site under hazardous or hygienic conditions. However, it would have been obvious to one of ordinary skill in the art the features of the robot can be applied easily to any suitable and desirable conditions and location. Verbeek discloses a mobile robot that is operating in hygienic conditions (Fig. 1, col. 2, lines 27-28).

***Conclusion***

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sze-Hon Kong whose telephone number is (571)270-1503. The examiner can normally be reached on 7:30AM-5PM Mon-Fri, Alt. Fri. Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Black can be reached on (571) 272-6956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

10/29/10

/Sze-Hon Kong/
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